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## Drug Use and Illnesses Among Eighth Grade Students in Rural Schools

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### Synopsis .....

*We examined the relationship between drug use by young adolescents and two indicators of illness, frequency of illness and numbers of days absent from school owing to illness. Data were from a general health survey of all eighth grade students*

*enrolled in public schools in two rural Maryland counties. A total of 745 students completed a self-administered questionnaire during school hours in January 1984. Information was obtained on a variety of sociodemographic characteristics and on the students' use of tobacco, alcohol, and marijuana.*

*Correlational analyses were used to examine the relationships among cigarette smoking, beer or wine drinking, whiskey or hard liquor drinking, and marijuana use. Logistic regression was used to model the effects of drug use behaviors on the likelihood of being absent from school 3 or more days, adjusting for the student's age, sex, race, parents' education, illness frequency, and concerns about learning problems in school.*

*We found substantial covariation among the use of cigarettes, alcohol, and marijuana. After adjusting for the background variables of illness, frequency, and learning problems, we found that students who are frequent cigarette smokers experienced a 2.6 risk of school absenteeism. Other drug use behaviors were not associated significantly with increased risk of missing school. Findings are discussed within the context of health-related consequences of drug use.*

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**P**ATTERNS OF DRUG USE by adolescents have served as a focal point for much recent research on adolescents' health (1-8). Interest has been stimulated partly by declines in the age at which drug-related behaviors are initiated as well as by growing evidence linking cigarette smoking and alcohol and marijuana use to the use of illicit drugs, poor school performance, delinquent acts, and early sexual activity (9-13).

While periods of highest drug use seem to occur during the late teens and early twenties, there is some evidence to suggest that use of alcohol and cigarettes may begin as early as age 10 and that the initiation of marijuana use occurs around age 13 (4). Longitudinal studies of junior high school students have identified psychological and sociological correlates of drug use, emphasizing those factors that explain early adoption of drugs (5,14-18). Less is known about adolescents who have well-established patterns of tobacco, alcohol,

and marijuana use during their pre-high school years. Though few in number, these youths may represent a group at particular risk for long-term social and health problems.

Research on the health consequences of drug use has focused primarily on cigarette smoking. The long-term effects of early cigarette smoking on adult rates of lung cancer, cardio-vascular disease, pneumonia, and emphysema are well supported by medical studies (19). Cross-sectional studies of cigarette smoking have suggested more immediate health consequences of frequent smoking. Adolescent smokers have been shown to be at an increased risk for acute respiratory illnesses and chronic respiratory symptoms (20-22). It is not known, however, whether adolescents who routinely use substances other than cigarettes, such as alcohol and marijuana, have poorer overall health or experience more frequent illnesses than occasional users or abstainers.

We explored the relationship between frequent drug use and self-reported illness experiences of eighth grade students. Eighth graders represent a group of young adolescents particularly well-suited to an investigation of health and drug use. The average age of an eighth grade student is 13 years. By 13, many girls have reached menarche and are undergoing major physical changes in their transition from childhood to adulthood. Interest and concerns about health assume a greater priority than they did during their preadolescent years. Brunswick and Josephson in their Harlem study noted that younger adolescents (12- to 15-year-olds) expressed more interest in their health than older youths (16 years and older), despite the fact that the number of diagnosed health problems in the study respondents increased with age (23). Despite declines in the age at which drug use is initiated, only a minority of 12- to 14-year-olds are regular smokers or heavy drinkers (19,24). National data indicates that among the 24 percent of high school seniors who were reported as daily smokers in 1985, 10 percent began smoking daily by eighth grade (24). Findings for the 1982 Maryland Drug Use Survey (36,000 students) showed that 11 percent of eighth graders reported consuming the equivalent of 5.6 oz. of absolute alcohol per week (19). Eighth graders who regularly use drugs represent an extreme group of youngsters whose behavior violates conventional social norms. Studies using high school and college students have shown substantial covariation among use of alcohol, marijuana, and cigarettes, leading some researchers to propose that these behaviors are best viewed as a group or syndrome, rather than as unique activities (11,16). Similar patterns are not well documented for young adolescents, particularly among rural youth.

## Methods

The data were drawn from a general health survey of eighth graders attending five public schools in two rural counties of Maryland in January 1984. The population of each county is about 30,000. Farming and fishing are major industries in both counties. All public schools containing an eighth grade were included, and the entire cohort of eighth graders was surveyed. Total enrollment of eighth graders in each county was about 400.

Data were gathered by means of questionnaires developed by the researchers in collaboration with the two local health departments and boards of

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education, and administered in class. The questionnaire asked for health concerns and self-reports of behaviors suitable for use in planning health education and school health programs for young adolescents. The questionnaire was field-tested prior to its administration, using eighth grade students from an adjoining rural county.

Questionnaires were administered in classrooms during school hours by trained research staff and were anonymous. Students were told that numbers would be assigned to each questionnaire but that personal identification of any individual was not possible. Consent to participate in the survey was obtained from parents and from each eighth grader. Students who were absent on the day of the survey were given the questionnaire by either the school nurse or school guidance counselor. Students completed the questionnaire in a private area in the school. These questionnaires were placed in sealed envelopes by the principal or school nurse and returned to the investigators.

Of the 789 questionnaires distributed, 745 were completed and considered usable. This procedure yielded a 94 percent response rate. Questionnaires were completed by the students within 1 45-minute class period. Students in the two counties did not differ significantly on a variety of sociodemographic characteristics (age, race, sex, household composition) or on their use of cigarettes, alcohol, or marijuana. Thus, the analysis reported in this paper is based on the entire sample of eighth graders.

Girls constituted about 52 percent of the sample, and boys, 48 percent. Sixty-three percent of the students were white, thirty-six percent were black and one percent was classified as other (Asian, Hispanic). Approximately three-fourths of the students were age-appropriate for grade level, that is born during 1970; 18 percent were 1 year older than grade level; and 7 percent were 2 years older. Two-thirds of the adolescents resided with both parents, 15 percent lived in single parent homes, and the remaining students reported a variety of household living relationships, such as with grand-

Table 1. Self-reported measures of current drug use and illness behaviors

Measures	Number reporting	Percent reporting
<b>Cigarette smoking<sup>1</sup>:</b>		
Nonuse.....	567	76.7
Experimental use.....	107	14.4
Frequent use.....	66	8.9
<b>Beer or wine:</b>		
Nonuse.....	209	28.8
Experimental use.....	423	57.0
Frequent use.....	104	14.2
<b>Whiskey or hard liquor:</b>		
Nonuse.....	455	62.3
Experimental use.....	239	32.7
Frequent use.....	36	5.0
<b>Marijuana:</b>		
Nonuse.....	643	87.3
Experimental use.....	58	8.0
Frequent use.....	35	4.7
<b>Index of drug use<sup>2</sup>:</b>		
0.....	207	27.3
1-2.....	352	47.2
3-4.....	125	16.8
5 or more.....	61	8.2
<b>Frequency of illness compared with others:</b>		
More often.....	39	5.3
About the same.....	270	37.0
Less often.....	421	57.7
<b>Number of days absent<sup>3</sup> from school in the past month from illness:</b>		
0.....	383	52.5
1-2.....	199	27.3
3 or more.....	148	20.2

<sup>1</sup> Nonuse (no use), experimental use (once or twice a year, once or twice a month), frequent use (every weekend, several times per week, daily).

<sup>2</sup> Index of use of cigarettes, beer or wine, whiskey or hard liquor, and marijuana. Scores of 0, 1, 2 (nonuse = 0, experimental use = 1, frequent use = 2) were assigned to each drug behavior and then summed across all 4 drugs. Scores ranged from 0 to 8.

<sup>3</sup> Number of reported school days missed ranged from 0 to 20 days with a mean of .56 days.

parents. Slightly more than half of the fathers and two-thirds of the mothers were reported as having a high-school education or greater.

Students were asked about learning problems in school. Sixteen percent of the eighth graders reported being frequently concerned about learning problems.

**Drug-use index.** In order to assess the effects of multiple drug use on illness experience, the four drug behaviors (cigarette smoking and the use of beer or wine, whiskey or hard liquor, and marijuana) were combined to form an index. Each drug behavior was scored on a three-point scale where no use equaled 0, experimental use (once or twice a year, once or twice a month) equaled 1, and frequent use (every weekend, several times per

week, daily) equaled 2. Scores were summed to create an index with a range from 0 to 8. The mean was 2.04, and the standard deviation was 2.25. About 27 percent of the students reported that they did not use any of the four drugs, while 8 percent said they used at least one drug on a frequent basis.

## Results

Table 1 presents some descriptive information on measures of drug use, frequency of illness, and reports of school absenteeism. Beer or wine was the most frequently reported substance, with marijuana having the lowest frequency of reported use. Overall, more eighth graders were nonsmokers (76.7 percent) than alcohol abstainers (28.8 percent for beer and wine, 62.3 percent for whiskey or hard liquor).

Most students saw themselves as in relatively good health, with only 5 percent reporting being sick more often than their peers, and more than half stating that they had not missed any school days in the past month for illness. The reported average number of school days missed (.56) is comparable to national figures of .58 for children 6 to 17 years of age (25).

Relationships among drug use behaviors, illness experience, and background characteristics of eighth graders are shown in table 2. School absenteeism was associated with more frequent cigarette smoking, multiple drug use, and reports of more frequent illness. Whiskey and marijuana use showed modest, positive correlations with absenteeism. Girls were somewhat more likely than boys to report missing school owing to illness, and to see themselves as sick more often than did their peers. Students whose parents did not complete high school reported greater absenteeism.

The magnitude of the correlations among drug use measures suggests that even at 13 or 14 years of age, drug behaviors are interrelated.

Since absenteeism from school can vary, depending on the background characteristics of the students, we conducted a series of multivariate analyses to see if the use of each drug, as well as multiple drug use, was a risk factor for school absenteeism, after adjusting for the student's age, sex, race, parents' educational level, reported frequency of illness, and concern with learning problems in school. Learning problems served as a proxy indicator of perceived academic difficulties. Table 3 presents findings from the logistic regression model that included frequent cigarette smok-

Table 2. Correlations among measures of current drug use, illness behaviors, and background characteristics of 685 eighth graders<sup>4</sup>

Measure	1	2	3	4	5	6	7	8	9	10	11
1 Cigarette smoking.....	—	<sup>1</sup> .37	<sup>1</sup> .31	<sup>1</sup> .40	<sup>1</sup> .67	<sup>3</sup> -.08	1.20	-.06	<sup>2</sup> .13	<sup>2</sup> -.12	<sup>3</sup> -.09
2 Beer or wine.....		—	<sup>1</sup> .54	<sup>1</sup> .40	<sup>1</sup> .59	-.03	.05	.03	.04	-.02	.06
3 Whiskey or hard liquor.....			—	<sup>1</sup> .44	<sup>1</sup> .57	-.04	<sup>3</sup> .10	.04	-.01	-.05	<sup>3</sup> -.09
4 Marijuana.....				—	<sup>1</sup> .64	-.01	<sup>3</sup> .10	.04	-.02	-.05	.06
5 Index of drug use.....					—	-.07	<sup>1</sup> .19	.03	<sup>3</sup> .07	-.05	<sup>2</sup> .14
6 Illness frequency.....							1.20	<sup>2</sup> -.13	<sup>1</sup> .18	-.01	.04
7 Days absent from school.....							—	<sup>3</sup> .10	.03	<sup>2</sup> .15	-.02
8 Sex.....								—	<sup>3</sup> .07	-.01	.04
9 Race.....									—	-.01	<sup>3</sup> -.09
10 Parents' education.....										—	<sup>3</sup> .10
11 Learning problems.....											—

<sup>1</sup> P < .001.

<sup>2</sup> P < .01.

<sup>3</sup> P < .05.

<sup>4</sup> Spearman's rank order correlations were computed as measures of association.

Cigarette smoking, beer or wine, whiskey or hard liquor, marijuana:

1 = no use, 2 = once or twice a year, 3 = once or twice a month, 4 = every

weekend, 5 = several times a week, 6 = daily.

Index of drug use: = 0-8.

Illness frequency: 1 = less often, 2 = about the same, 3 = more often.

Days absent from school: number of days reported in past 30 days.

Parents' education: 1 = high school or greater, 0 = less than high school.

Learning problems: 1 = often concerned about learning problems in school.

0 = not often concerned

ing. In data not shown, use of beer or wine did not significantly increase the likelihood of missing 3 or more school days. Models with use of whiskey or hard liquor and marijuana use were unstable owing to the limited dispersion of those drug behaviors. The index of drug use was highly related to absenteeism (OR = 3.57); however, when the analysis was rerun with cigarette smoking removed from the index, the resulting odds ratio was only slightly greater than 1 (OR 1.07), suggesting that the main contributing factor to increased risk was cigarettes.

Table 3 shows that, after adjustment, students who are frequent smokers are 2.68 times more likely to report missing 3 or more days of school owing to illness than are other students. Additionally, adolescents who are frequently concerned about learning problems and those who are older than their peers are at significantly greater risk for reported absenteeism.

## Discussion

Analyses of data from a sample of rural eighth grade students indicate that clustering or covariation among drug using behaviors is not confined to high school or college populations. Our results suggest that by age 14, a small but not insignificant group of youngsters has already adopted patterns of regular alcohol and drug use. The identification and characterization of these young adolescents have policy implications for the development of preventive drug use programs for children in sixth and seventh grades.

The most striking finding concerns the relationship between frequent cigarette smoking and school absenteeism. Whether as a result of respiratory illnesses or other reasons, frequent smokers in this study have a significantly greater risk of reported school absenteeism. These findings are suggestive of a relationship between frequent smoking and illness experiences. Parental reports are required to corroborate illness-related absenteeism, since the schools tabulate absences but do not record the reasons for missed school days.

Caution should be exercised in evaluating the findings from this study. Findings are based entirely on self-reported data and may be influenced by the veracity of the students. Sensitive items, such as drug use, are potentially subject to biased reporting. While we have no independent means of assessing the validity of responses, two features of the study design foster truthful reporting. First, drug use was not the focus of the study. Drug use items were included along with a variety of other health behaviors, such as sleeping and eating patterns. Second, students completed the questionnaires anonymously. No identifying information was attached to the questionnaire and the issue of confidentiality was stressed with the students. There is some empirical evidence in the literature to suggest truthful reporting by adolescents. Analyses of the validity of self-reported cigarette smoking indicate modest but significant correlations between self-reported information and biochemical measures of cigarette smoking, such as thiocyanate levels of carbon monoxide concentration in breath samples (26-28). Finally, the distri-

**Table 3. Odds ratios for missing 3 or more days from school in the past month, adjusting for background characteristics of 685 eighth graders; reported illness frequency, concern with learning problems in school, and frequent cigarette smoking**

Variable	Beta	Standard error	Odds ratio	95 Percent confidence level
Age	0.603	0.284	1.83	(1.05; 3.19)
Sex	-0.434	0.213	0.65	(0.43; 0.98)
Race	0.122	0.225	1.13	(0.73; 1.75)
Parents' education	0.699	0.213	0.50	(0.33; 0.75)
Illness frequency	-0.911	0.207	0.40	(0.27; 0.60)
Learning problems	0.534	0.260	1.70	(1.02; 2.84)
Frequent cigarette use	0.988	0.305	2.68	(1.48; 4.85)

NOTE: Model  $\chi^2 = 67.23$ , 7 df.,  $P < .001$ .  
 Frequent cigarette use includes response categories "several times per week," and "daily."  
 Odds ratio is the ratio of the odds of missing 3 or more days for a given

age, race, sex, parents' education, illness frequency, learning problems, and frequent cigarette use category relative to an odds of missing fewer than 3 days of school in the past month.

bution of responses to the drug use items in this study were similar to data reported from the Survey of Drug Abuse Among Maryland Adolescents (24).

This study was focused on rural adolescents, a group not often the subject of drug use studies. Research in adolescent drug use has concentrated on urban populations. Data from the Survey of Drug Abuse Among Maryland Adolescents suggest that patterns of drug use for rural teenagers differ from patterns of those living in large metropolitan areas (24). Eighth graders in rural counties reported somewhat greater use of alcohol and less marijuana use than those in suburban or urban areas. Research on patterns of drug use and the potential health consequences for young rural adolescents would broaden our knowledge of adolescent drug use. Findings could be used to improve the effectiveness of drug-related educational activities by targeting the specific needs of youngsters who live in rural communities.

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## Injury Fatalities Among Young Children

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### Synopsis .....

*Injuries and violence are the primary causes of death among young children in the United States. In particular, in 1982-84 motor vehicle injuries, fires, drowning, and homicide were the leading external causes of death at ages 1-4 years and 5-9 years, accounting for nearly 80 percent of all deaths from external causes. The purpose of this article is to analyze race and sex differentials in injury fatalities among young children. Race and sex differentials in injury mortality were measured in terms of relative risks, that is, race (black to white) and sex (male to female) mortality ratios. Race ratios for external causes ranged from 1.7 to 1.9 for children 1-4 and 5-9, while sex ratios were*

*somewhat lower, 1.4 to 1.8. Although race and sex ratios were relatively small for passenger-related motor vehicle fatalities (0.8 to 1.2) the ratios for pedestrian-related injuries were considerably greater (1.5 to 2.0). Race ratios for deaths caused by fires and homicide were particularly large (3.4 to 4.3).*

*Mortality differences were also measured in terms of excess mortality. For each age-race group more than 65 percent of the overall excess deaths among males were due to external causes of death. Pedestrian-related motor vehicle injuries and drownings accounted for the largest proportion of excess deaths among males. At ages 1-4, 53 percent of the overall excess deaths among blacks were due to external causes. Deaths caused by fires and homicide accounted for more than two-fifths of the excess in this age group. At ages 5-9, 81 percent of excess mortality among black males and 69 percent among black females were accounted for by external causes. Fires, pedestrian-related motor vehicle fatalities, and homicides accounted for nearly 65 percent of excess mortality among black children.*

*There has been a 30 percent decline in death rates from all external causes between 1972-74 and 1982-84. Pedestrian-related motor vehicle death rates declined the most in both age groups. Mortality also declined in each age-race-sex group for passenger-related motor vehicle injuries, for drownings, and for fires except among black males ages 5-9. Homicide, in contrast, increased in both age groups. There has been little change, however, in the incidence of injuries among children. Thus, it appears that declines in fatalities accounted for a major portion of the mortality reduction.*